

## PRODUCT SAFETY SUMMARY: MALEIC ANHYDRIDE

*This Product Safety Summary is intended to provide a general description of certain Huntsman chemical substances and products containing the chemical substance(s). The information in this Summary is not intended to replace the information included on the Safety Data Sheet (SDS), Product Safety Label, and other safe use and handling literature for the chemical substance(s).*

### Chemical Identity

This Product Safety Summary covers the chemical substance below:

CAS #	Chemical Name	Synonyms
108-31-6	Furan-2,5-dione	Maleic anhydride

### General Product Overview

In Huntsman, maleic anhydride is manufactured and marketed as a raw material for the production of chemicals and polymers. Maleic anhydride is not marketed by Huntsman directly for consumer use. Maleic anhydride is marketed by Huntsman as an industrial intermediate for downstream use by professional and competent chemical producers. Maleic anhydride is fully consumed in the manufacture of chemicals and polymers and hence it is not expected to present an exposure risk to downstream users or consumers.

### Applications and Uses

Maleic anhydride is manufactured by Huntsman primarily to be marketed as a chemical intermediate for the downstream manufacture of chemical and polymer products. End products based on these polymers are used in colorants, coatings, plastics, fibers, washing, cleaning and water treatment applications. Huntsman does not market maleic anhydride directly for consumer use.

## Physical and Chemical Properties

Maleic anhydride is a solid ranging from colorless to white, with an acrid odor.

Certain physical properties for maleic anhydride are summarized below:

<b>Melting/freezing point</b>	53-58°C
<b>Boiling point</b>	200°C
<b>Vapor pressure</b>	33 Pa @ 25°C
<b>Density</b>	1.48 g/cm <sup>3</sup> @ 20°C
<b>Solubility in water</b>	Insoluble

Additional physical and chemical property information is available on the product Safety Data Sheet (SDS), which can be requested at [SDS@huntsman.com](mailto:SDS@huntsman.com).

## Human Health Information

The potential to experience health effects associated with overexposure to maleic anhydride depends on the exposure level, route, duration, as well as other factors, including individual susceptibility. The potential health effects from overexposure to maleic anhydride are discussed below.

Different regulatory classification criteria apply in different geographic regions. These differing criteria can result in different human health regulatory classifications for the same products in different geographic regions. Specific regulatory classification information is contained in the Safety Data Sheet for each product in use in the specific geographic region. The acute and chronic health effects information below is based on Safety Data Sheets in use in the United States.

### Acute Health Effects

Acute overexposure of humans to maleic anhydride by inhalation has been observed to cause irritation of the respiratory tract, burning in the larynx, reflex cough, lacrimation, headaches, eye irritation, and corneal burns. Acute animal tests in rats, mice, rabbits, and guinea pigs have demonstrated maleic anhydride to have moderate acute toxicity by ingestion and moderate to low acute toxicity from dermal exposure. Bronchial asthma was observed in guinea pigs acutely exposed to maleic anhydride.

Skin contact may cause severe burns and may produce an allergic skin reaction in sensitive individuals. Ingestion of maleic anhydride may cause digestive tract burns.

Eye contact may cause serious eye damage with symptoms of eye burns, conjunctivitis and photophobia (sensitivity of the eye to light).

## Chronic Health Effects

Repeated or prolonged exposure to maleic anhydride by inhalation or skin has been observed to cause chronic bronchitis, asthma-like attacks, pulmonary edema, upper respiratory tract irritation, and dermatitis. Renal lesions, decreased body weight and increased kidney weight were observed in orally exposed rats to maleic anhydride chronically.

In Reproductive/Developmental toxicity studies, toxicity on fertility, teratogenic, or fetotoxic effects were not observed in the rats exposed orally to maleic anhydride.

Animal studies did not show positive evidence for carcinogenicity, mutagenicity, or genotoxicity.

More information can be obtained in the specific product Safety Data Sheet, which can be requested at [SDS@huntsman.com](mailto:SDS@huntsman.com).

## Environmental Information

In Huntsman, maleic anhydride is an industrial raw material used in closed systems. During normal operating conditions, maleic anhydride is not expected to be released to the air, soil or water. Procedural and/or control technologies are used to minimize emissions and potential exposure during cleaning and maintenance activities. Maleic anhydride is reacted in closed systems with other chemicals and/or monomers.

## Environmental Fate

Maleic anhydride hydrolyses rapidly forming the hydrolysis product maleic acid. Maleic anhydride and maleic acid are readily biodegradable, Maleic anhydride is not expected to be bioaccumulative.

## Environmental Toxicity Testing

Environmental toxicity test data from several aquatic species show that maleic anhydride should not be considered to have high environmental toxicity to aquatic organisms.



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More information can be obtained in the specific product Safety Data Sheet.

## Potential Consumer Exposure

Maleic anhydride is not marketed by Huntsman directly for consumer use. Maleic anhydride is fully consumed in the manufacture of chemicals and polymers hence it is not expected to present an exposure risk to downstream users or consumers.

## Safe Use Recommendations/Workplace Exposure Controls

Huntsman follows workplace exposure guidelines through a variety of industrial hygiene and ventilation measures. Workplace exposure guidelines include national/regional workplace limit values, such as:

- The American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value-Time Weighted Average (TLV-TWA) – the concentration for a conventional 8-hour workday and a 40-hour workweek for a working lifetime without adverse effect). The TLV-TWA for maleic anhydride is 0.1 mg/m<sup>3</sup>.
- The Occupational Safety and Health Administration's permissible exposure limit (OSHA PEL) expressed as a timeweighted average – the concentration of a substance to which most workers can be exposed without adverse effect averaged over a normal 8-hour workday or a 40-hour workweek). The OSHA PEL for maleic anhydride is 0.25 ppm (ca. 1 mg/m<sup>3</sup>).

More guidance and information are provided in the Safety Data Sheets.

See the Safety Data Sheets for additional information about first aid measures, accidental releases (spills and leaks), waste disposal, toxicity, transportation, regulatory requirements, and other important topics.

## Regulatory Information/Classification and Labeling

Under the Globally Harmonized System (GHS) for Hazard Communication, substances are classified according to their physical, health, and environmental hazards. The hazards are communicated via specific labels and the Safety Data Sheets. GHS attempts to standardize hazard communication so that the intended audience (workers, consumers, transport workers, and emergency responders) can better understand the hazards of the chemicals in use.

Note: The hazard statements and symbols presented here refer to the hazard properties of the concentrated substance and are meant to provide a brief overview of the substance's labeling. It is not intended to be comprehensive or to replace information found in the Safety Data Sheet.

## Labeling according to OSHA 1910.1200 (GHS)



<b>Signal Word</b>
Danger

GHS Classification	
Acute toxicity (oral)	Category 4
Skin corrosive	Category 1
Serious eye damage	Category 1
Skin sensitization	Category 1
Respiratory sensitization	Category 1
Specific target organ toxicity – single exposure	Category 1 (respiratory system)
Specific target organ toxicity – repeated exposure	Category 2 (kidney)
Aquatic acute	Category 3

<b>Hazard Statements</b>	
H302	Harmful if swallowed
H314	Causes severe burns and eye damage
H317	May cause an allergic skin reaction
H334	May cause allergy or asthma symptoms or breathing difficulties if inhaled
H372	Causes damage to organs through prolonged or repeated exposure
H373	May cause damage to organs through prolonged or repeated exposure
H403	Harmful to aquatic life

## **Additional Information**

Information on registered substances is available on the European Chemicals Agency (ECHA) website at <https://echa.europa.eu>.



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IN ALL CASES, IT IS THE RESPONSIBILITY OF THE USER TO DETERMINE THE APPLICABILITY OF SUCH INFORMATION AND RECOMMENDATIONS AND THE SUITABILITY OF ANY PRODUCT FOR ITS OWN PARTICULAR PURPOSE.

THE PRODUCT MAY PRESENT HAZARDS AND SHOULD BE USED WITH CAUTION. WHILE CERTAIN HAZARDS ARE DESCRIBED IN THIS PUBLICATION, NO GUARANTEE IS MADE THAT THESE ARE THE ONLY HAZARDS THAT EXIST.

Hazards, toxicity, and behavior of the products may differ when used with other materials and are dependent upon the manufacturing circumstances or other processes. Such hazards, toxicity, and behavior should be determined by the user and made known to handlers, processors, and end users.

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## References

U.S. Environmental Protection Agency. Integrated Risk Information System (IRIS) on Maleic Anhydride. National Center for Environmental Assessment, Office of Research and Development, Washington, DC. 2019.

National Institute for Occupational Safety and Health (NIOSH). Pocket Guide to Chemical Hazards. U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention. Cincinnati, OH. 2019.

American Conference of Governmental Industrial Hygienists (ACGIH). 1996 TLVs and BEIs. Threshold Limit Values for Chemical Substances and Physical Agents, Biological Exposure Indices. Cincinnati, OH. 1996.